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Application No.: 10/091,942

Docket No.: JCLA8556

**OFFICIAL**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of: )  
Jing-Hong Gan )  
Anchor Chen ) Examiner : WARREN, MATTHEW E  
Serial No. : 10/091,942 ) Art Unit : 2815  
Filed : 03/05/2002 ) Docket No. : JCLA8556  
For : VARIABLE CAPACTOR )  
STRUCTURE AND METHOD OF )  
MANUFACTURE )

No fee is believed to be due. However, the Commissioner is authorized to charge any fees required in connection with the filing of this paper to account No. 50-0710 (Order No.: JCLA8556)

**AMENDMENT AND RESPONSE TO OFFICE ACTION**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

*Okay to  
Enter  
new  
8/30/04*

Dear Sir:

The Office Action mailed May 20, 2004 has been carefully considered. In response thereto, please enter the following amendments and consider the following remarks.

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**In The Claims:**

Claim 1 (currently amended) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped well has a cavity;

a first-type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

a second type ion-doped region at the bottom of the cavity of the first type ion-doped well; and

a conductive layer including a contact over the first type ion-doped buried layer, wherein the conductive layer and the first type ion-doped buried layer are connected;

wherein the second type ion-doped region and the conductive layer are located within the same active device region of the substrate, and the conductive layer is isolated from the second type ion-doped region through an insulation layer.

Claim 2 (original) The variable capacitor of claim 1, wherein the structure further includes a first metal silicide layer over the second type ion-doped region.

Claim 3 (original) The variable capacitor of claim 1, wherein the conductive layer further includes a second type ion-doped deep collector region.

Claim 4 (original) The variable capacitor of claim 3, wherein the structure further includes a second metal silicide layer over the second type ion-doped deep collector region.

Claims 5-6 (canceled)

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Claim 7 (original) The variable capacitor of claim 1, wherein the structure further includes a second metal silicide layer between the first type ion-doped buried layer and the conductive layer.

Claim 8 (original) The variable capacitor of claim 1, wherein the structure further includes an isolation structure within the first type ion-doped well between the second type ion-doped region and the conductive layer.

Claim 9 (canceled)

Claim 10 (original) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped region has a shallow trench isolation structure;

a first type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

at least one second type ion-doped region in the first type ion-doped well at the bottom of the shallow trench isolation structure; and

at least one first conductive layer connected to the first type ion-doped buried layer.

Claim 11 (original) The variable capacitor of claim 10, wherein the first type ion-doped buried layer is an N-type buried layer and the second type ion-doped region is a P-doped region.

Claim 12 (original) The variable capacitor of claim 10, wherein the structure further includes at least a second conductive layer connected with the second type ion-doped region.

Claim 13 (original) The variable capacitor of claim 10, wherein the structure further includes a metal silicide layer between the first type ion-doped buried layer and the first conductive layer.

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Claim-14 28 (currently amended) The variable capacitor of claim-5 1, wherein the contact is isolated from the second type ion-doped region through an insulation layer.

Claim-15 29 (currently amended) The variable capacitor of claim-14 28, wherein the first-type ion-doped buried layer has a second cavity and the conductive layer is over the second cavity of the first-type ion-doped buried layer.

Claim-16 30 (currently amended) The variable capacitor of claim-15 29, wherein the structure further includes a second metal silicide layer on a surface of the second cavity of the first-type ion-doped buried layer and between the first type ion-doped buried layer and the conductive layer.

Claim 31 (new) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped well has a cavity;

a first-type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

a second type ion-doped region at the bottom of the cavity of the first type ion-doped well; and

a conductive layer including a contact over the first type ion-doped buried layer, wherein the conductive layer and the first type ion-doped buried layer are connected;

wherein the contact is isolated from the second type ion-doped region through an insulation layer, the first-type ion-doped buried layer has a second cavity and the conductive layer is over the second cavity of the first-type ion-doped buried layer.